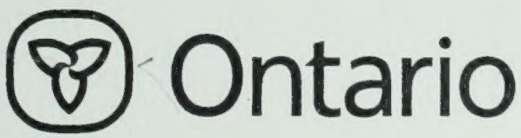
DEVELOPMENT OF

RETURNABLE PACKAGING

FINAL REPORT

INDUSTRIAL WASTE DIVERSION PROGRAM

NOVEMBER 1996



Ministry of
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INDUSTRIAL WASTE DIVERSION PROGRAM

Report submitted by:

Woodbridge Group

Report prepared by:

Peter Ledoux
Ratan Agrawal

Report prepared for:

Waste Reduction Branch
Ontario Ministry of Environment and Energy

DISCLAIMER

This report was prepared for the Ontario Ministry of Environment and Energy as part of a Ministry funded project. The views and ideas expressed in this report are those of the author and do not necessarily reflect the views and policies of the Ministry of Environment and Energy, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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ABSTRACT

This project was undertaken to develop a returnable container to replace the cardboard box on a wooden skid currently used by The Woodbridge Group in its Ontario plants. It was estimated that this type of container could improve a number of aspects of the manufacture of product by the Woodbridge Group. These aspects included housekeeping, simpler line usage, better truck utilization as well as cost efficiency.

This container was developed for our Ontario operations by Sertapak Inc., a Canadian packaging company in Ingersol, Ontario. This development has led to a number of other applications of this concept by Sertapak resulting in further sales and jobs.

The package that was developed is an identical recyclable lid and base made of double wall polyethylene with a recyclable triplewall cardboard sleeve in between, known in the industry as a sleeve pack. The pack developed by the Woodbridge Group had the sleeve in two pieces to improve the ergonomics of removing parts from this pack by allowing the removal of one side for better and safer access to the parts.

We were then able to verify our economic estimates and demonstrate that the investment in this type of container was cost effective. Woodbridge has since gone on to equip all its North American plants with this type of container. The resulting savings have been one step in making our Ontario based company the most cost effective supplier of Urethane Foam Seat Cushions.

INTRODUCTION

This report was prepared for the Ministry of Environment and Energy as part of the Industrial Waste Diversion Program (IWDP) Grant Agreement requirement.

THE WOODBRIDGE GROUP

The Woodbridge Group is an Ontario based manufacturer of urethane foam used for automotive seating. There are eleven North American plants three of which are in Ontario. The Ontario plants are situated in Tilbury, Woodbridge and Whitby.

A number of components including frames, wire reinforcements, cut cloths and pieces of Velcro are molded into Urethane Cushions and Backs. Prior to this project most of these components were shipped in corrugated boxes on wood pallets and in wood crates. These were disposed of at our plants either to landfill or through local cardboard recyclers. They use the space within a truck rather poorly because they cannot be stacked more than two high inside the truck

The Woodbridge Group manufactures in excess of 46 million foam pads per annum Each of these pads has an average of just over four components for almost 200 million components per year. The early target of this project was the frames used in the rear seats These were shipped in boxes about 60" long by 48" wide by 36" high reinforced with wood corner posts The value of each box varied from a low of $15 each to a high of $40 each depending on the construction of the box. Forty of these containers fit in a standard 53' truck trailer. The sleeve pack that we selected is 63" long by 48" wide by 36" high and can be stacked three high in a standard truck trailer. Thus 60 of these containers can fit into a standard 53' truck trailer. This efficient use of the truck cube more than pays for the return of the container which collapses in a ratio of 3 66 1 (See Set Up Guide for container illustration).

OBJECTIVE

As stated in our original IWDP Application, the objective of this project was to develop a returnable container to replace the cardboard boxes and wooden skids employed in the transportation and storage of components used to manufacture urethane foam seat cushions for the major automobile companies.

We estimated that this project would avoid the disposal of about 50 tons of cardboard and 70 tons of wooden skids per annum.

We further estimated that two 440 Km trips per week would be eliminated due to better utilization of the cubic capacity of over the road trailers.

These savings were to assist us in meeting the requirements of Regulation 347 and Bill 143 The truck trips saved would also contribute to a reduction of CO2, CO and Hydrocarbon emissions per Regulation 346.

THE PROJECT

1) In the spring of 1993 Woodbridge started the development of a package to replace the cardboard boxes and wooden skid combinations used to transport components for the Urethane Foam cushions produced at our Ontario plants in Tilbury, Woodbridge and Whitby. We reviewed a metal container with folding sides, a plastic container with folding sides and a container consisting of an identical double wall polyethylene base and lid, and a triplewall cardboard sleeve between the two. After a few plant trials and a review of pricing we decided that the third container better known as a sleeve pack, was the best for our application. Of the various sleevepack designs we chose one developed by Sertapak Inc. in Ingersoll, Ontario.

   This container was chosen over other sleevepack designs because the double wall construction of the base provided a rigid solid platform for this application. The lid and base were identical which meant that we had fewer parts to control in our transportation network. The sleeve was made of triplewall cardboard. Sertapak estimated that we would get about 75 cycles from each sleeve. The worn out lids and bases as well as the cardboard sleeves will be recycled. This container was also the least expensive of the three options.

2) In July of 1993 an initial order was placed for 370 of these containers for our Tilbury plant. They would be used to transport frames from Paramount Metal in Cleveland, Ohio. The containers were delivered in late August, 1993 and performed the task perfectly. This eliminated the disposal of 2.9 tons of cardboard and 11.5 tons of wood per month. It also eliminated one 430 kilometer truck run per week between Tilbury and Cleveland.

3) After a six month trial during which this container performed very well we decided to implement this container throughout our transportation network. We ordered 440 containers to transport frames from Douglas and Lomason in Saltillo, Mexico to our plant in Tilbury, Ontario. These were received in August 1994. This eliminated the disposal of 3.0 tons of cardboard and 13 tons of wood per month. This also eliminated one 2000 kilometer run per week between Saltillo, Mexico and our Tilbury plant.

4) At about this same time we ordered 604 containers to transport component parts from Guelph Tool and Die in Guelph, Ontario, Chelsea Industries in Chelsea, Michigan, Young Spring and Wire in Archbold, Ohio and CM Products in Dayton, Ohio to the Ontario plants listed above. These containers were received in the late spring of 1994. This eliminated the disposal of 1.2 tons of cardboard and 3.2 tons of wood per month. We are currently changing our transportation network to take advantage of this new container by decreasing the number of truck runs for these parts. Since we had already exceeded the limit of the Grant we did not seek funding for this part of the project.

RESULTS AND CONCLUSIONS

1) Within weeks of our first installation of these containers their benefit was readily apparent. The plants involved became cleaner, that is, the housekeeping improved markedly. The flow of parts through the plant was simpler and inventory control was better.

2) The expected gains were also immediate. The price of the frames transported from Cleveland and Saltillo to our Tilbury plant decreased an average of $.75 each resulting in an overall savings of $300,000 per annum. The transportation cost also dropped due to less runs being required for the same number of parts. This has resulted in a decrease in cost of about $130,000 per annum.

3) In some cases we also saw an increase in productivity due to being able to use the parts right out of this package rather than transferring it to a holder on line. We also did not have to break the container down or dispose of it, thus avoiding about $5,000 per annum in disposal costs.

4) After a thorough analysis of the obvious as well as the hidden savings, we have come to the conclusion that, in general, this type of investment decreases costs significantly and yields a payback in the area of one year. Investment in this project in our Ontario plants for instance, has yielded a payback of just under one year as compared to our original estimate of 2.5 years. The improvement in payback was mainly due to an increase in volume without the need for extra capital and higher than predicted savings for the original corrugated containers. This coupled with the positive effects on the environment, makes it an excellent investment for any company that can organize itself well enough to control the return of these containers. Our industry is particularly well suited to this type of control.

5) Without the assistance of the Ministry management might not have considered the economics of using returnable containers instead of disposable containers. The amount of waste eliminated far exceeded our expectations. As Table 2 shows the savings in wood waste (332 Tons) was over three times our estimate of 78 tons per annum. Cardboard waste elimination was 60% higher than expected, about 80 tons per annum versus an estimated 50 tons per annum.

6) The elimination of over 130,000 truck kilometers per year is another benefit that this project brings to the environment.

7) We have now implemented this project in all our North American plants and have experienced a proportionate decrease in waste in all of them. Wood waste has decreased over 1000 tons per annum and cardboard waste over 275 tons per annum. To do this, we have purchased in excess of 8000 containers at a cost of over $1.5 million producing a savings per annum of just over $2.0 million.

8) The design of this container was submitted to the Environment and Plastics Institute of Canada for consideration for the Ron Hayter Award. A copy of this submission is enclosed Woodbridge was given an Honourable Mention Award for this design.

WASTE STREAM SAVINGS (TONS)

YEAR	MONTH	WOOD	CARDBOARD	WOOD TO DATE	CARDBOARD TO DATE	WOOD YEAR TO DATE	CARDBOARD YEAR TO DATE
1993	OCT	11.5	2.9	12	3	12	3
	NOV	11.5	2.9	23	6	23	6
	DEC	11.5	2.9	35	9	35	9
1994	JAN	11.5	2.9	46	12	12	3
	FEB	11.5	2.9	58	15	23	6
	MAR	11.5	2.9	69	17	35	9
	APR	11.5	2.9	81	20	46	12
	MAY	11.5	2.9	92	23	58	15
	JUNE	14.7	3.7	107	27	72	18
	JULY	14.7	3.7	121	31	87	22
	AUG	14.7	3.7	136	34	102	26
	SEPT	14.7	3.7	151	38	116	29
	OCT	27.7	6.7	179	45	144	36
	NOV	27.7	6.7	206	51	172	43
	DEC	27.7	6.7	234	58	199	49
1995	JAN	27.7	6.7	262	65	28	7
	FEB	27.7	6.7	289	72	55	13
	MAR	27.7	6.7	317	78	83	20
	APR	27.7	6.7	345	85	111	27
	MAY	27.7	6.7	372	92	139	34
	JUNE	27.7	6.7	400	98	166	40
	JULY	27.7	6.7	428	105	194	47
	AUG	27.7	6.7	456	112	222	54
	SEPT	27.7	6.7	483	118	249	60
	OCT	27.7	6.7	511	125	277	67
	NOV	27.7	6.7	539	132	305	74
	DEC	27.7	6.7	566	138	332	80

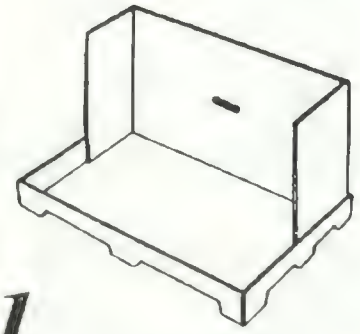
TABLE 1

COMPARISON OF ACTUAL AND ESTIMATED WASTE STREAM SAVINGS				
WASTE STREAM	PROJECT ESTIMATED SAVINGS (TONS / ANNUM)	ACTUAL SAVINGS (TONS / ANNUM)	INCREASED SAVINGS (TONS / ANNUM)	PERCENT INCREASE
WOOD	78	332	252	325%
CARDBOARD	50	80	30	60%
TOTAL	128	412	284	222%

TABLE 2

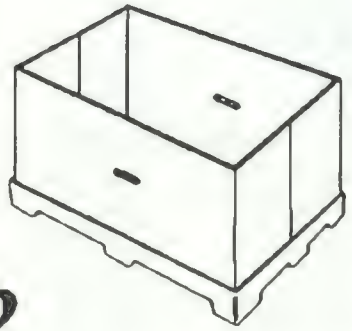
Set Up Guide

- POSITION HALF SLEEVE
- LOAD PRODUCT



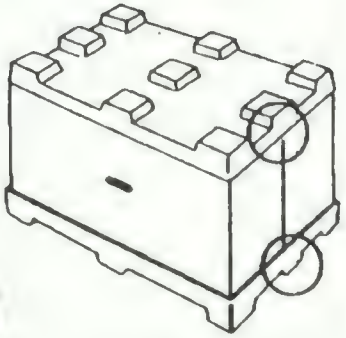
1

- ADD SECOND HALF SLEEVE



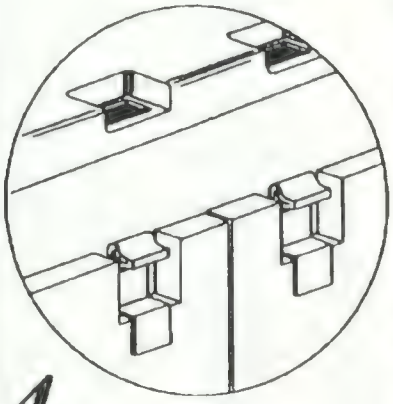
2

- SECURE TOP PALLET
- ENSURE PROPER SUR-LOK LOCATION
- 4 ON EACH END



3

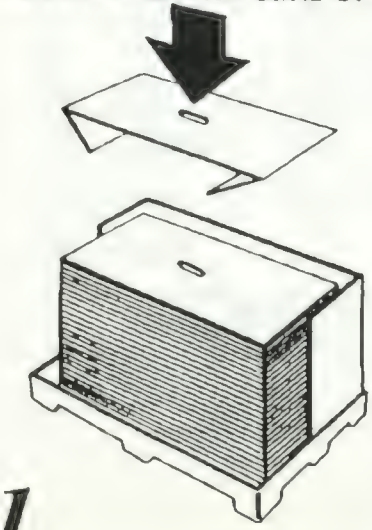
- TO UNLOCK • PUSH INWARD ON THE ORANGE CLIP
- TO LOCK • PUSH PALLET OVER CLIPS FIRMLY



4

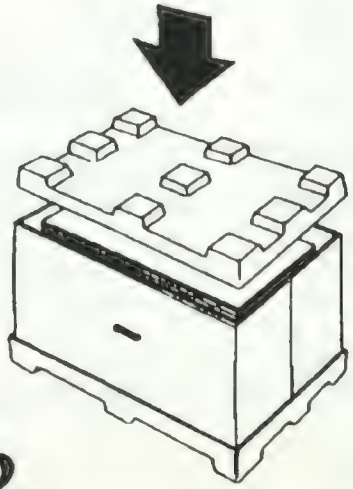
Knock Down Guide

- FOLD WINGS OF SLEEVE
- LAY ON PALLET
- KEEP PRINTED SIDE UP



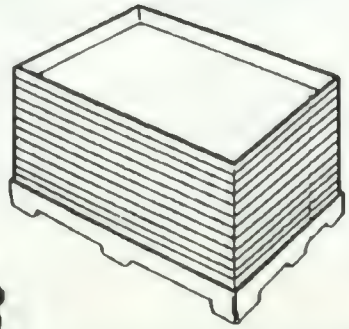
1

- 20 SLEEVES FIT INTO THE SET UP PACK



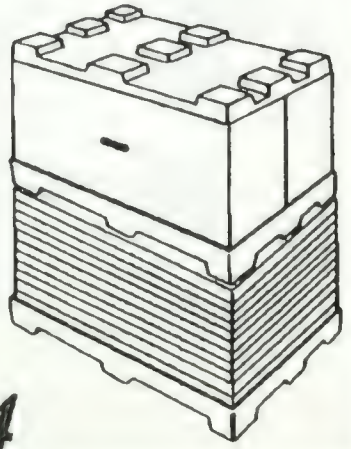
2

- THE CORRESPONDING 20 PALLETS ARE NESTED



3

- LOAD THE SET UP PACK ON TOP OF THE STACK OF NESTED PALLETS



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EPIC ENVIRONMENT AND PLASTICS INSTITUTE OF CANADA

THE RON HAYTER AWARD

FOR MERITORIOUS ENVIRONMENTAL DESIGN IN PLASTIC PACKAGING

HONOURABLE MENTION

INDUSTRIAL, COMMERCIAL & INSTITUTIONAL PACKAGING

The Woodbridge Group

CHAIRMAN, DESIGN COMMITTEE

PRESIDENT, EPIC

THE WOODBRIDGE GROUP

September 14, 1994

Ms. Charmian Entine
Director, Plastics Packaging & the Environment
Environment and Plastics Institute of Canada
1262 Don Mills Road
Suite 104
Don Mills, Ontario, M3B 2W7

Dear Ms. Entine:

Re: RON HAYTER AWARD

We are very pleased to submit this application to you for the 1994 Ron Hayter Award. Our unique design of the **Woodbridge Incoming Components (WIC)** returnable container was developed together with Sertapak Inc., packaging systems.

Through the innovative use of conventional plastic materials, we were able to create a modular packaging system that eliminated millions of pounds of packaging waste such as wooden crates and corrugated cartons, reduced fuel consumption, emissions (exhaust gases CO2, CO and NOx), and transportation costs. The WIC returnable container components are either manufactured entirely from or enhanced with plastic materials.

The application is prepared based on the guidelines established by your institute. All supporting documents are appended for your perusal and further consideration. Two coloured slides of the modular design, as required by you, will be sent by separate mail.

We look forward to hearing from you.

Yours very truly,

The Woodbridge Group

Ratan Agrawal, M.Sc., P.Eng.
Corporate Manager
Health, Safety and Environment

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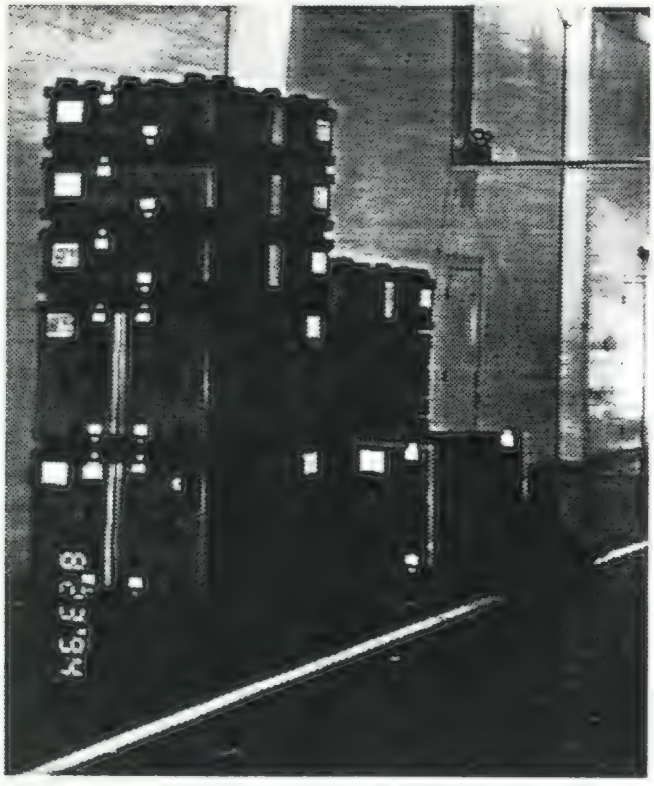
THE RON HAYTER AWARD



THE WOODBRIDGE GROUP

The Woodbridge Incoming Component (W.I.C.) Returnable Container

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♦ ♦ ♦

THE RON HAYTER AWARD

FOR MERITORIOUS ENVIRONMENTAL DESIGN IN PLASTIC PACKAGING

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APPLICATION FORM

Name and position: **Ratan Agrawal**, Corporate Manager
Health, Safety, & Environment

Name, position, company and telephone number of others who participated in the innovation and would be co-recipients of the award:

The Woodbridge Group (810) 288-0100

Peter Ledoux, Manager
Manufacturing, Engineering & Logistics

Don Lowe, Manager
Corporate Manufacturing Engineering

Walt Marzetti,
Corporate Manufacturing Engineer

Sertapak Inc (519) 425-5000

C.J. David Nettleton, President

Packaging Objectives:

To eliminate land-filling of packaging wastes as well as the pollution associated with the production, processing and distribution of automotive component packaging.

Environmental Significance of the Accomplishment:

Through the innovative use of conventional plastic materials, we were able to create a modular packaging system that eliminated millions of pounds of packaging waste, reduced fuel consumption, emissions (exhaust gases CO2, CO and NOx), and transportation costs.

Commercial Availability: October 1992

Submitted by: Ratan Agrawal **Date:** September 14, 1994
Corporation: The Woodbridge Group
Address: 4240 Sherwoodtowne Blvd. Suite 300, Mississauga, Ontario
Telephone: (905) 896-3626 **Fax:** (905) 896-8592

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THE RON HAYTER AWARD

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Executive Summary

In June of 1992, The Woodbridge Group launched a project aimed at reducing the use of expendable packaging for purchased components. The first phase of the project was to eliminate the use of both disposable corrugated fiberboard and wood pallets. Large containers, mainly utilized in the transport of oversized, but light weight, seat frames from suppliers to various Woodbridge facilities in North America, were selected as primary targets.

The new Woodbridge Incoming Component (WIC) returnable container was developed using extensive product research, ground up design, and repeated testing. This resulted in a container that satisfies *all* Woodbridge applications and now provides for the economic handling of components in transit, as well as in use, both at the supplier locations and Woodbridge facilities. Elimination of disposable containers had substantial impacts on our operations. In addition to the primary cost savings present in the avoidance of purchasing expendable packaging, secondary benefits emerged as an enormous amount of material was averted from landfill. Additionally, transportation efficiencies were greatly improved.

To date, The Woodbridge Group has successfully eliminated the use of all large expendable pallet/box containers, as well as the smaller expendable boxes that were previously handled on wood pallets. Corporate mandate states that any new business programs awarded to The Woodbridge Group must utilize returnable shipping containers.

There are now over 7,700 WIC returnable containers in the Woodbridge corporate pool. The container has met with great enthusiasm from both suppliers *and* customers Sertapak is currently producing a basic container for other automotive manufacturers and many Woodbridge suppliers are working with Sertapak to develop applications and proposals for their markets. Recently, a major customer requested that a Woodbridge facility develop a proposal to replace the current metal shipping baskets with the WIC returnable containers. Justification for this proposal will be driven by pack quality improvements, transportation cost savings, and improved operator ergonomics. We have, as yet found no limits to the practicality of this container within our market. Because of the container's simple, light-weight and cross-functional design, applications seem without boundaries.

I. PACKAGING OBJECTIVES

- ❒ To produce a returnable, reusable container
- ❒ To improve trailer cubing during shipping
- ❒ To be recyclable
- ❒ To be usable for warehousing *and* shipping purposes
- ❒ To produce a container that retains value after its useful life
- ❒ To be simple yet versatile
- ❒ To utilize a modular configuration

II. DEGREE OF INNOVATION/CREATIVITY

Taking advantage of triple wall corrugated strength, coated with a polymer based material, the WIC returnable container uses traditional packaging materials in a non-traditional manner. The completely recyclable container, requiring no ancillary packaging such as stretch-wrap and banding consists of only two components: pallet and sleeve. Firmly locking the sleeve of the container into the pallet, the plastic Surlok™ clips result in a heavy-duty container providing in-plant storage as well as maximum cubing efficiencies in transit. Superior column strength, attained by the interlocking capabilities of the plastic pallet (see Attachment 1) provide consistently safe yet sturdy deliveries. The decision to coat the container with bright orange polymer represents to the users that the container is a serious capital investment, not merely an expendable package.

III. CONTRIBUTION TO ENVIRONMENTAL IMPROVEMENT

The Woodbridge Group's awareness of its environmental responsibility has been a driving force in the design of its new returnable container. The WIC returnable container epitomizes the Woodbridge idea of environmental consciousness and obligation. Consisting of 100% recyclable components, the container itself will never make it to the landfill. Introduced in October of 1992, Woodbridge has yet to experience any pack failures.

Not only has the container eliminated corrugated cardboard and wood pallets exceeding two million pounds annually, but a total of 800,000 miles of freight transport have been saved (see Attachment II). As a result of the freight miles eliminated, emissions wastes including carbon dioxide (CO2), carbon monoxide (CO) and nitrous oxide (NOx) have been reduced through the elimination of tractor trailers on the highway.

Total landfill dollar savings estimated at $ 60,000 annually in addition to over $1 million savings in transportation amount to substantial financial gains through environmental improvement.

IV. Reduction of Energy Consumption

The Woodbridge Group's new distribution capabilities, resulting from the implementation of the WIC returnable container enabled the company to consolidate freight shipments from suppliers using a consolidation point. Through consolidation, Woodbridge suppliers ship components for *all* Woodbridge plants on *one truck* sent to the consolidation point. Upon receipt of *all* trucks from the suppliers, the trucks are re-arranged at the consolidation point to provide a week's worth of components from all suppliers for each plant. Under the old system, each supplier would ship partial truckloads (LTLs) to the plant it supplied resulting in numerous weekly deliveries at each Woodbridge facility.

The WIC returnable container provides for a reduction in the number of deliveries made to plants allowing less time and energy to be expended for each partial shipment. The goal, elimination of partial truckloads has eradicated hundreds of trucks annually, through consolidation, resulting in a significant reduction in the amount of energy consumed as well as substantial capital gains for Woodbridge.

V. Commercial Viability

Much consideration was given to the range of applicability of the WIC returnable container upon design providing for an end result that fits a wide scale of uses. Specifically at Woodbridge, uses range from heavy-duty metallic components to premium quality finished goods in the form of foam seats. Container use is not limited to delivery but is extended to temporary in-plant storage and at the line use. The ability to remove one-half sleeve reduces the amount of bending and reaching on the part of the operators who use the WIC returnable container at the foam line.

Having been met with wide receptiveness in the automotive, textile, industrial and free flow bulk materials markets, the WIC returnable container proves adaptable to a wide range of uses. Industrial goods, cast parts, clothing and free flow goods are just a few examples of the products the container is currently being used for.

VI. Features and Benefits of Package

Designing the WIC returnable container, engineers had ergonomics and efficiency as primary objectives. The returnable container, consisting of only two components (pallet and sleeve) provides ease of use for assembly and disassembly. With a small amount of pressure applied to the plastic Surlok™ clip, the container is easily locked into place and ready for use. Disassembly consists of squeezing each of the plastic Surloks™ and pulling up on the pallet. Plastic pallets were engineered to weigh less than 40 pounds each allowing one operator minimal effort to place the pallet.

Expendable packaging involves sidewall pressure limitation, thus forcing a "two high" stacking procedure resulting in an approximated trailer utilization of sixty percent. Container improvements, which eliminated the sidewall pressure issue, allowed better trailer cubing and resulted in trailer utilization of approximately ninety-five percent. In most cases, trailer utilization improvements more than covered the costs for return shipment of empty containers to the component suppliers for re-use.

Due to the collapsibility of the containers, the collapsed container fits within itself providing a 3.66 to 1 return ratio. As a result, WIC returnable containers use only a fraction of the uncollapsed container's volume, therefore, reducing the number of back hauls to Woodbridge suppliers. The ability to store large of containers efficiently provides more warehousing space for alternate uses within Woodbridge plants.

Another distinct feature, inter-nesting pallets, reduces exposure to operator injury. Woodbridge designed the WIC pallets to lock together firmly assuring maximum safety for large stacks. One quick glance at a stack of WIC returnable containers will determine whether or not they are locked into place. A simple lateral movement of the upper container will allow the pallets to lock into place, thus forming a neat stack (see photos).

VII. Unique Usage of Plastic Properties

The uniqueness of the WIC returnable container is that all product components are either manufactured from or enhanced with plastic materials. Without these materials, the product would not have its recyclable and reusable properties. Surlok ™ locking clips, consisting of polypropylene take advantage of a long life living hinge. Without the plastic ingredient, the clip's useful life would be substantially reduced.

The triple wall paper corrugated sleeve is coated with an acrylic based polymer that allows for superior stacking strength and maximum re-use. The coating also serves as a moisture repellent guaranteeing a substantially longer useful life. The sleeve itself is repulpable upon termination of its useful life.

The strongest component of the WIC returnable container, the plastic pallet consisting of 100% polyethylene takes the brunt of use. The 380 gauge plastic lugs are strategically placed to allow the pallets to nest together, achieve maximum stability and allow fork-lifting.

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THE RON HAYTER AWARD

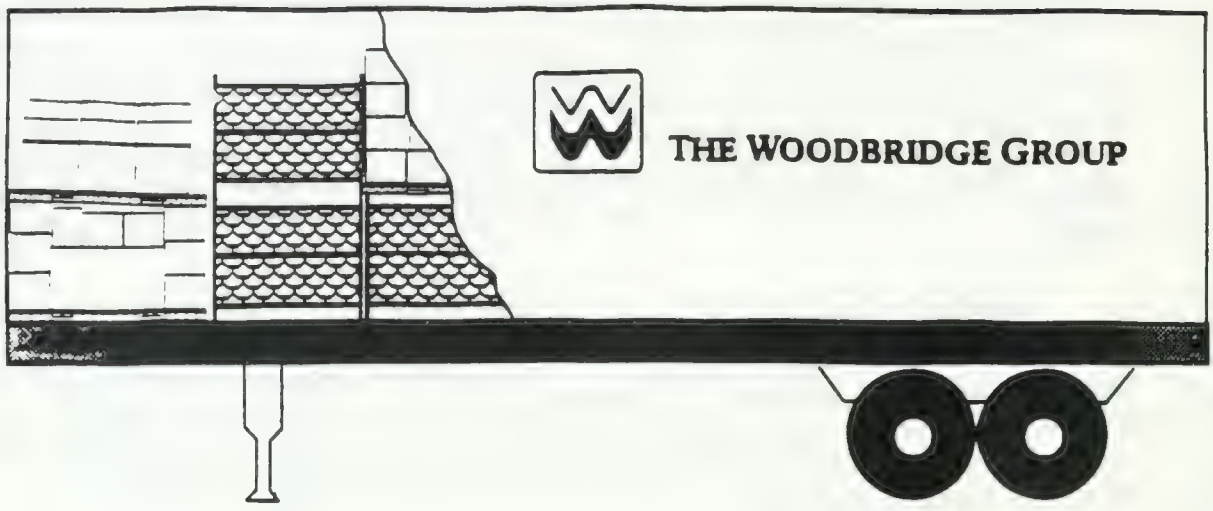

Illustration showing traditional trailer cubing before WIC Container

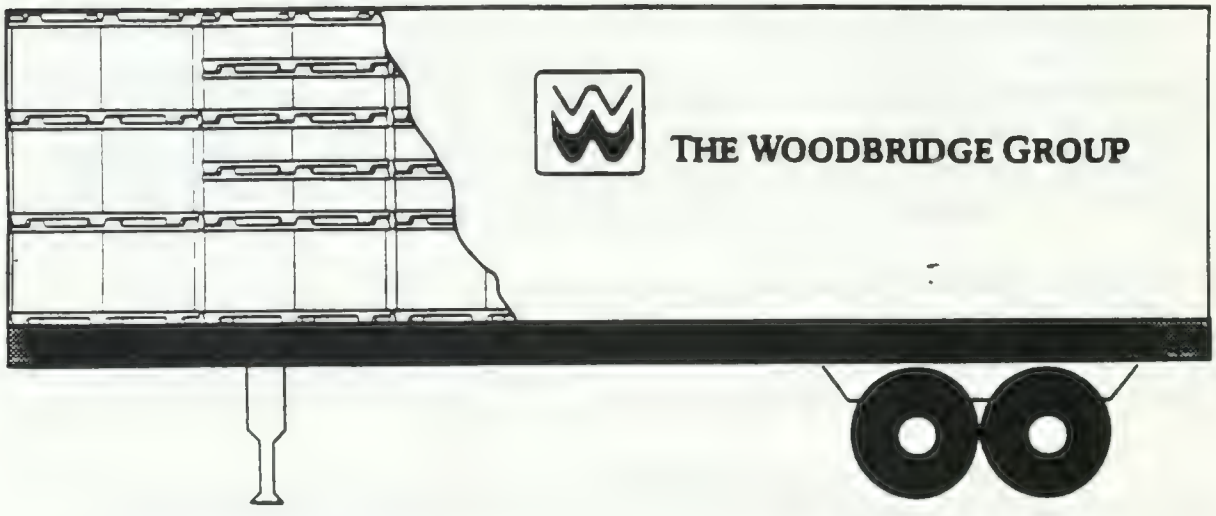

Illustration showing typical WIC Container trailer cubing

Landfill Avoidance

The above graphic represents the annual amount of waste averted from landfill. Each truck symbolizes 80,000 pounds.

Total: 2,400,000 pounds

ATTACHMENT II

TECHNICAL DAT

GRADE: BA50-100

HIGH-DENSITY POLYETHYLENE

PAXON® BA50-100 is a high molecular weight, high density polyethylene copolymer. This resin has superior stress crack resistance combined with high impact strength and rigidity. It is designed for use in blow molding of large containers and for extrusion into exceptionally tough sheet. This resin meets all the requirements of the FDA for olefin polymers to be used as articles for contact with food as set forth in 21 CFR 177.1520 (c) 3.1, 3.2

PROPERTY	ASTM TEST	NOMINAL VALUE* U.S. SYSTEM	METRIC SYSTEM
Classification			
Type	D1248-84		III
Class	D1248-84		A
Category	D1248-84		5
Melt index, 190/2.16	D1238-89		<0.1 g/10 min
Flow rate, 190/21.6 (HLMI)	D1238-89		10 g/10 min
Density	D1505-85		0.949 g/cm^3
Mechanical			
Tensile strength at yield	D638-89	3,600 psi	25 MPa
Elongation at break	D638-89	>600%	>600%
Flexural modulus	D790-86	165,000 psi	1,140 MPa
Tensile impact	D1822-89	170 ft. lbs/in^2	36 joules/cm^2
Impact brittleness temperature	D746-79	<−105° F	<−76° C
Environmental stress crack resistance	D1693-70	>800 hrs	>800 hrs
Hardness, Shore D	D2240-86	68	68
Thermal			
Vicat softening temperature	D1525-87	254° F	123° C
Heat deflection temperature, 66 psi load	D648-82	157° F	70° C
Coefficient of linear thermal expansion	D696-79	7x10^{-5} in/in/°F	1.2x10^{-4}cm/cm/°C
Processing			
Bulk density	D1895-89	37 lbs/ft^3	590 kg/m^3

*All values are determined on specimens prepared according to ASTM 1248-84 Standard Specifications for Polyethylene Plastic Molding and Ex- Materials. Nominal values should not be interpreted as specifications.

APPENDIX I

PALLET

PAXON POLYMER COMPANY
A JOINT VENTURE OF EXXON CHEMICAL AND SIGNAL
2875 SCENIC HWY (504) 778-7000
POST OFFICE BOX 53006
BATON ROUGE, LA 70892-3006
PHONE 504 775 4330

PAXON POLYMER COMPANY

Michem® Coat 40E & 40H

Gluable Multi-Purpose Coatings

FEATURES & BENEFITS

- Cold-Set & Hot Melt Gluable
- Grease Resistant
- Water Resistant
- Printable

TYPICAL USES

- Meat
- Bakery
- Dairy

PURPOSE

MICHEM COAT 40E and MICHEM COAT 40H coatings are truly "multi-functional": they impart grease and water resistance to shipping containers, yet are fully gluable with a wide range of water-based and hot melt adhesives. Either Michem Coat is an excellent choice for a general-purpose coating.

GLUABILITY

MICHEM COAT 40E and MICHEM COAT 40H coatings are gluable with both water-based and hot melt adhesives. We find that, while water-based adhesives fortified with a solvent are most successful, there are many solventless glues which have proven effective. Hot melt adhesives must overcome both the temperature resistance and the oil resistance of the coatings. A list of many adhesives which have been evaluated by our laboratory is available from your Michelman representative.

APPLICATION METHODS

Both MICHEM COAT 40E and MICHEM COAT 40H can be applied at the corrugator using a Michelman blade or rod coater. At the dry end, 40H is usually preferred, while at the wet end 40E is often the better choice. Roll coaters are not recommended with MICHEM COAT 40E, and flexo applications are not recommended with either product; MICRYL 763 could be used on the flexo in place of these Michem Coat formulations.

APPENDIX II

40E EXTERIOR COATING - SLEEVE

TECHNICAL INFORMATION

MICHEM COAT 40E and MICHEM COAT 40H are water-based emulsions designed for corrugator application. Normal coating weights are 2.0–3.0 wet pounds per MSF (10–15 GSM). The suitability of any coating weight should be worked out between the box maker and end user. MICHEM COAT 40E and MICHEM COAT 40H are **repulpable** in both acid and alkaline systems. These Michem Coats are also flexo-printable (can be printed over).

(Specifications on Reverse Side)

MICHELMAN

Michelman, Inc.,
9080 Shell Road, Cincinnati, OH 45236-1299 USA
Tel: 513-793-7766 / Fax: 513-793-2504

Coating X300

Excellent Water Resistance

FEATURES & BENEFITS

- Highly Water Resistant
- Moisture Resistant
- Meat Release
- Nonabrasive

TYPICAL USES

- Meat and Poultry
- Produce and Citrus
- Outdoor Storage
- Frozen Food Products

PURPOSE

COATING X300 imparts a very high level of water resistance and water beading to corrugated board when applied in-line on the corrugator. In addition, COATING X300 can be used as a release coating for meat products, as a moisture barrier or as a nonabrasive coating. COATING X300 is available in a variety of modified formulations to solve specific end-use requirements.

GLUABILITY

COATING X300 is gluable *only* with hot melt adhesives. Cold set adhesives will *not* successfully bond X300-coated surfaces because of the coating's high water resistance. A list of hot melt adhesives which have been evaluated by our laboratory is available from your Michelman representative.

APPLICATION METHODS

COATING X300 can be applied at the corrugator using a Michelman blade or rod coater. Because some strike-in will occur with wet-end applications, dry-end applications tend to give slightly better coating performance. Roll coaters can also be used to apply COATING X300AF ("Anti-Foam") if sufficient drying capacity exists. Flexo applications of X300 are not recommended; we suggest using MICRYL 763 instead.

TECHNICAL INFORMATION

COATING X300 is a water-based acrylic emulsion designed for corrugator application. Normal coating weight is 2.0–3.0 wet pounds per MSF (10–15 GSM). The suitability of any coating weight should be worked out between the box maker and end user. COATING X300 is **repulpable** in both acid and alkaline systems.

APPENDIX III

X300 INTERIOR COATING - WICSP *(Specifications on Reverse Side)*

MICHELMAN
Michelman, Inc.
9080 Shell Road, Cincinnati, OH 45236-1299 USA
Tel: 513-793-7766 / Fax: 513-793-2504

STANDARD MATERIAL: High Density Polyethylene (HDPE)

PROPERTY RANGES:

DENSITY: .950 - .962 g/cu. gm
MELT INDEX: .3 - .7 g/10 min

MATERIAL WEIGHT RANGE:

SINGLEFACE: 80 - 325 #/MSF
DOUBLEFACE: 130 - 500 #/MSF

MAXIMUM WIDTH: 60 inches; direction of corrugation.

STANDARD LENGTHS: Custom cut, 20 inches to 144 inches, no extra charge, on orders of 400 # or more.

MATERIAL THICKNESS: Dependent on material weight.

STANDARD COLOR: Natural (translucent).

AVAILABLE STOCK COLORS: White, black, blue, green, yellow, beige, brown, red. Two-tone combinations and special colors available upon request.

SPECIAL ADDITIVES: U.V. stabilizers, conductive fillers, VCI, mica loading, etc. are available upon request.

THERMAL RESISTANCE(F): .34 hr/sq.ft/degree F per BTU (160#/MSF Bd)

THERMAL CONDUCTIVITY(K): .47 BTU/in/hr/sq.ft/degree F (160#/MSF Bd)

LIGHT TRANSPARENCY: 58.8% (160#/MSF copolymer, natural color, ASTM D-1003)

NOTE: Other thermoplastic base resins are available on special order. The specifications listed herein may change in the event that a different base material is used. All data shown is nominal.

APPENDIX IV

CORRUPLAST LINER - WICSS

United States Corrulite Corporation
P.O. Box 2307, Clewiston, FL 33440
(407) 996-2089

Sertapak Inc

Packaging Systems

Service by Design™

August 17, 1993

Ms. Irene Pater, P. Eng.
Project Engineer
Industrial Programs Unit
Ministry of the Environment
Waste Management Branch
2 St. Clair Avenue West
Toronto, Ontario
M4V 1L5

APPENDIX V

SERTAPAK LETTER

Dear Ms. Pater:

Re: The Industrial Waste Diversion Program (IWDP) Application
The Woodbridge Group

We're writing with respect to The Woodbridge Group's application for financial assistance under the IWDP. We would like to supplement the information provided by Woodbridge in their application.

Sertapak has been providing packaging system solutions to companies for eleven years. We have been involved in returnable packaging systems for approximately six years focusing primarily on the industrial market.

All of the returnable systems we have supplied have reduced waste. One program for General Motors, implemented in 1989, reduced the amount of paper corrugated containers and wood pallets reaching landfill at the rate of 400,000 lbs. per year. Another GM program, in that same year, reduced waste by 2,850 lbs. per day.

The potential for waste reduction with these programs is astronomical. We have seen our returnable packaging revenue remain steady throughout 1991 and 1992 in spite of the recession and are now experiencing, in the latter half of 1992 and in 1993, significant growth in our returnable packaging sales as more and more companies are realizing the significant environmental benefits of returnable packaging programs. The Woodbridge Group has been leading the way.

Woodbridge, with their WICSP and WICSS programs, and the help of Sertapak, have done what many companies have failed to do, develop a standard returnable packaging system that can be used for many different applications within their system. The waste reduction potential for this program, within Woodbridge, is enormous. The returnable container design used in this system incorporates a unique paper/plastic corrugated laminate. The sleeve uses the

271 INGERSOLL STREET, P.O. BOX 128, INGERSOLL, ONTARIO, CANADA N5C 3K1
PHONE: (519) 425-5000 IN WATTS: 1-800-265-1162 FAX 1-800-265-1793

properties of both materials to achieve a cost effective design that outperforms similar "one material" sleeves. Based on initial testing it is expected that this sleeve/pallet container will be acceptable for a wide variety of applications. The footprint of this "sleeve pack" is 48" x 63" resulting in excellent truck utilization. The pack will also knock down for return shipment minimizing return freight costs.

The potential of this pack outside of Woodbridge is also significant. The Big Pak® plastic pallet system is available in over 30 footprints, with tooling in place. The paper and plastic substrates used in the sleeve design can be manufactured to fit all the available pallet footprints and at virtually any height parameters. The tooling cost for different sleeve designs is relatively low. The unique plastic/paper sleeve design and plastic pallet combination can be reproduced in numerous configurations resulting in tremendous potential for other applications.

With the resurgence of returnable packaging systems, Sertapak has seen a 40% increase in sales in the past fiscal year, primarily due to returnables. We expect to see growth of another 25% this year. Our employee growth has been similar. We now have, depending on the jobs on the go, 50 people employed at Sertapak, about a 30% increase over last year. Our suppliers are experiencing similar growth.

We see returnable packaging systems becoming the norm in the next few years. The waste reduction benefits are tremendous and the financial payback is significant as well. A program we are currently building for Harrison Radiator, a division of GM, was designed and costed using returnable containers. Previously, returnable containers would have been investigated only as an alternative.

Please let us know if we can be of any further assistance.

Sincerely,
SERTAPAK INC. PACKAGING SYSTEMS

Bruce T. Orr
Director, Finance & Marketing

BO:cd